# Depth of Field

*Phil Deschamp*

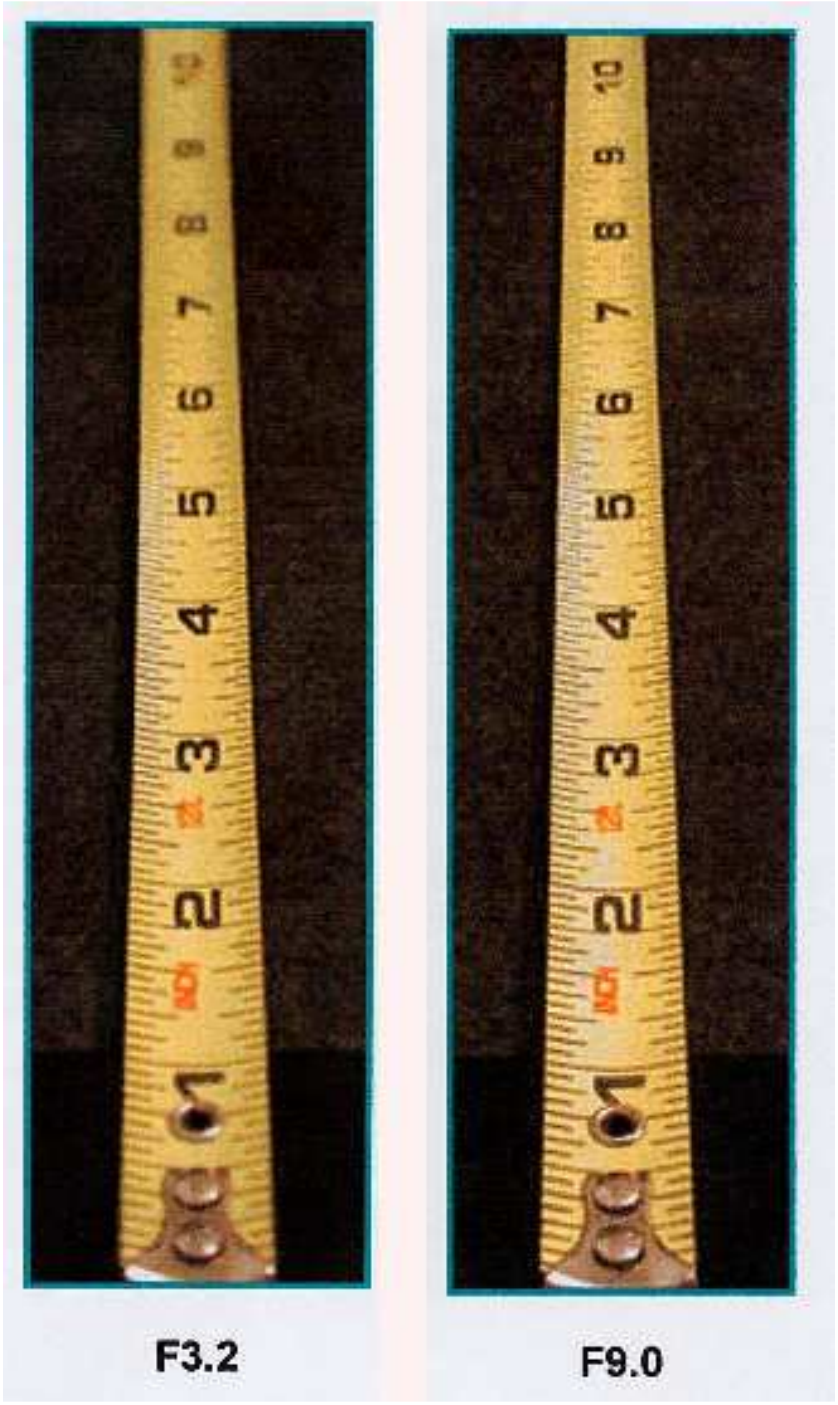
## Definition of Depth of Field

When a lens focuses on a subject some objects that are just in front of or just behind the subject may also seem sharp.

They are not truly sharp but our eyes cannot detect very small degree of unsharpness.

The **zone of acceptable sharpness** is called the **Depth of Field**.

This much in focus at f3.2




This much in focus at f9.0

Which camera mode do you use?

P

S

A

M

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# Which camera mode do you use?

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S = Shutter speed (Set the speed you want and find out about your DOF when you get your film developed.)

A = Aperture (Choose your aperture and therefore your Depth of Field.)

M = Manual (For control DOF and shutter speed. Who does this? Most professionals!)

# Calculating DOF

- You could read it off old lenses – especially standard (not zoom) lenses.

# DOF scale on the lens


Focused at 5m at f16 the DOF is from 2.75m to infinity

# Calculating DOF

But modern zooms seldom have the scale, so?

You can use the DOF Preview button

Or can you?

# Image as seen through viewfinder at f3.5

Now press the DOF Preview button

# Image as seen through DOF Preview at f3.5

See any difference? Not at f3.5 as the aperture is wide open

# Image as seen through viewfinder at f22

Now press the DOF Preview button

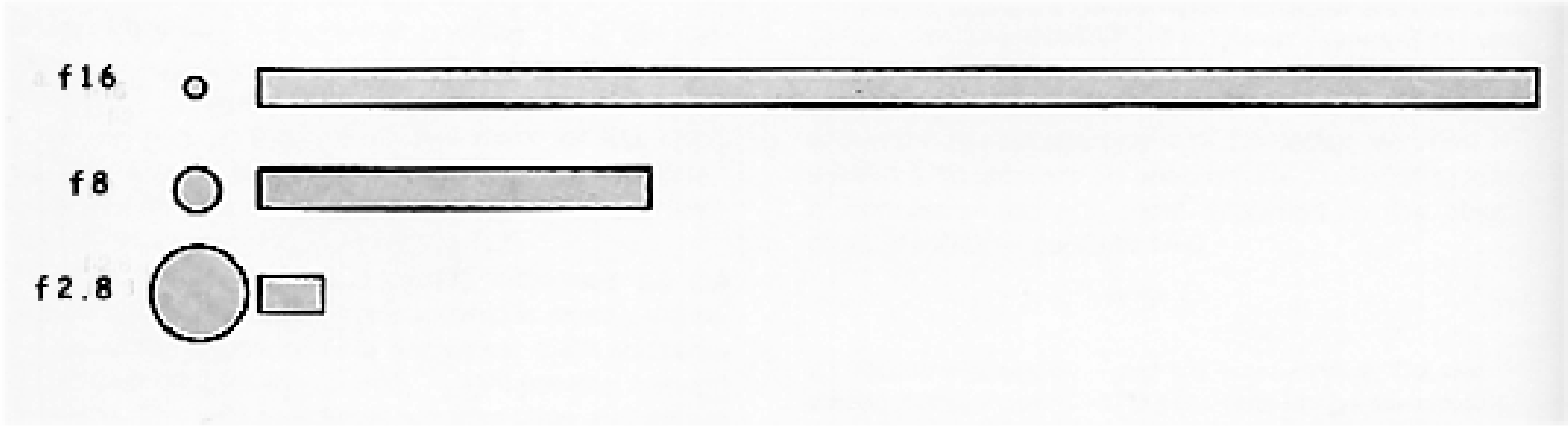
# Image as seen through DOF Preview at f22

See any difference? See anything at all? Not me!

Other things equal,

the smaller the f-stop (aperture)

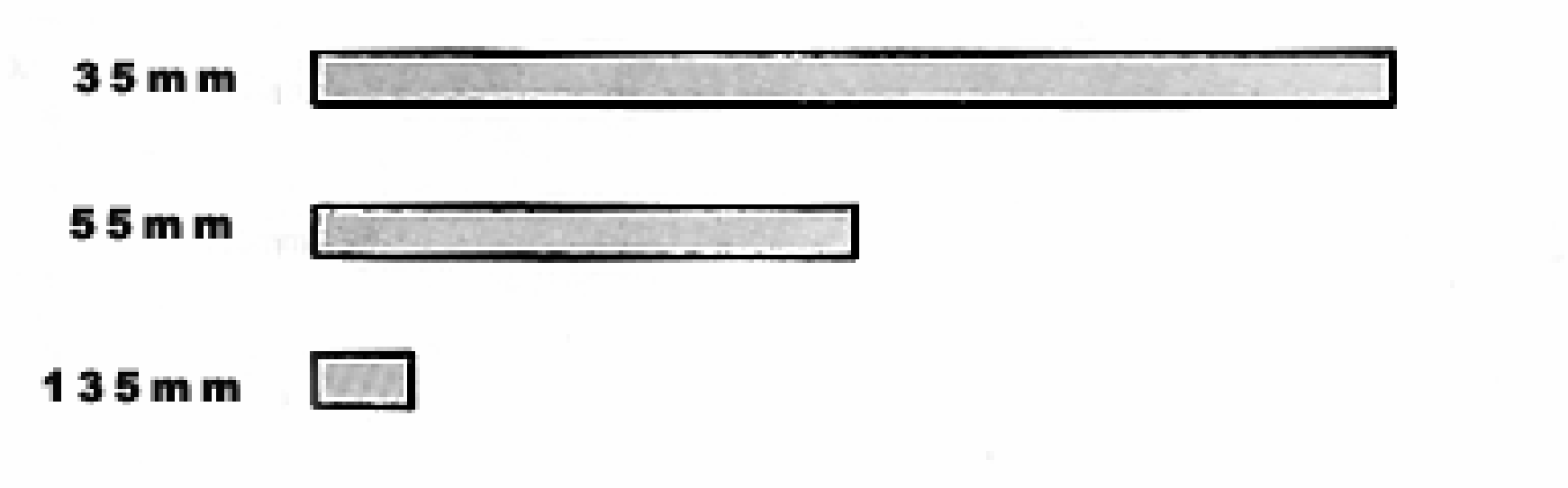
the greater the DOF



Other things equal

the shorter the focal length of the lens

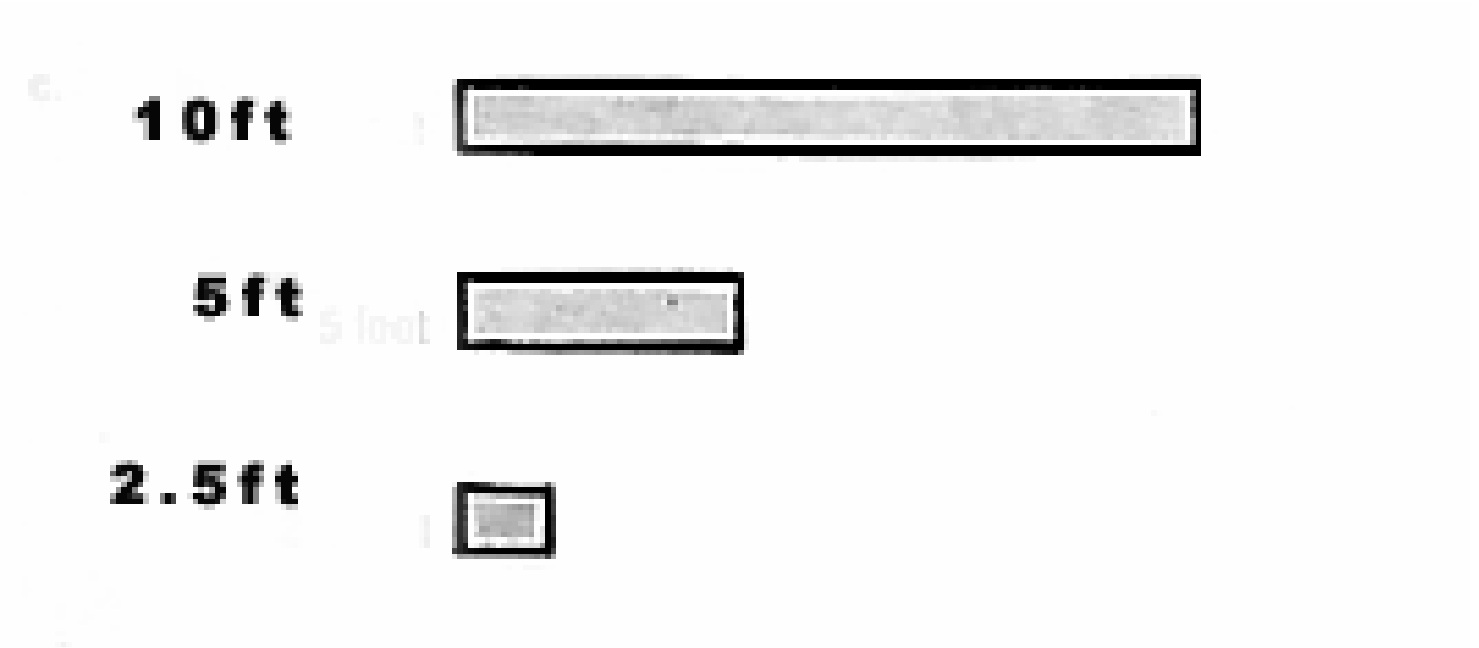
the greater the DOF



Other things equal

the closer the object

the narrower the DOF



# Calculating DOF

But modern zooms seldom have the scale, so?

- You can use an online calculator or computer software

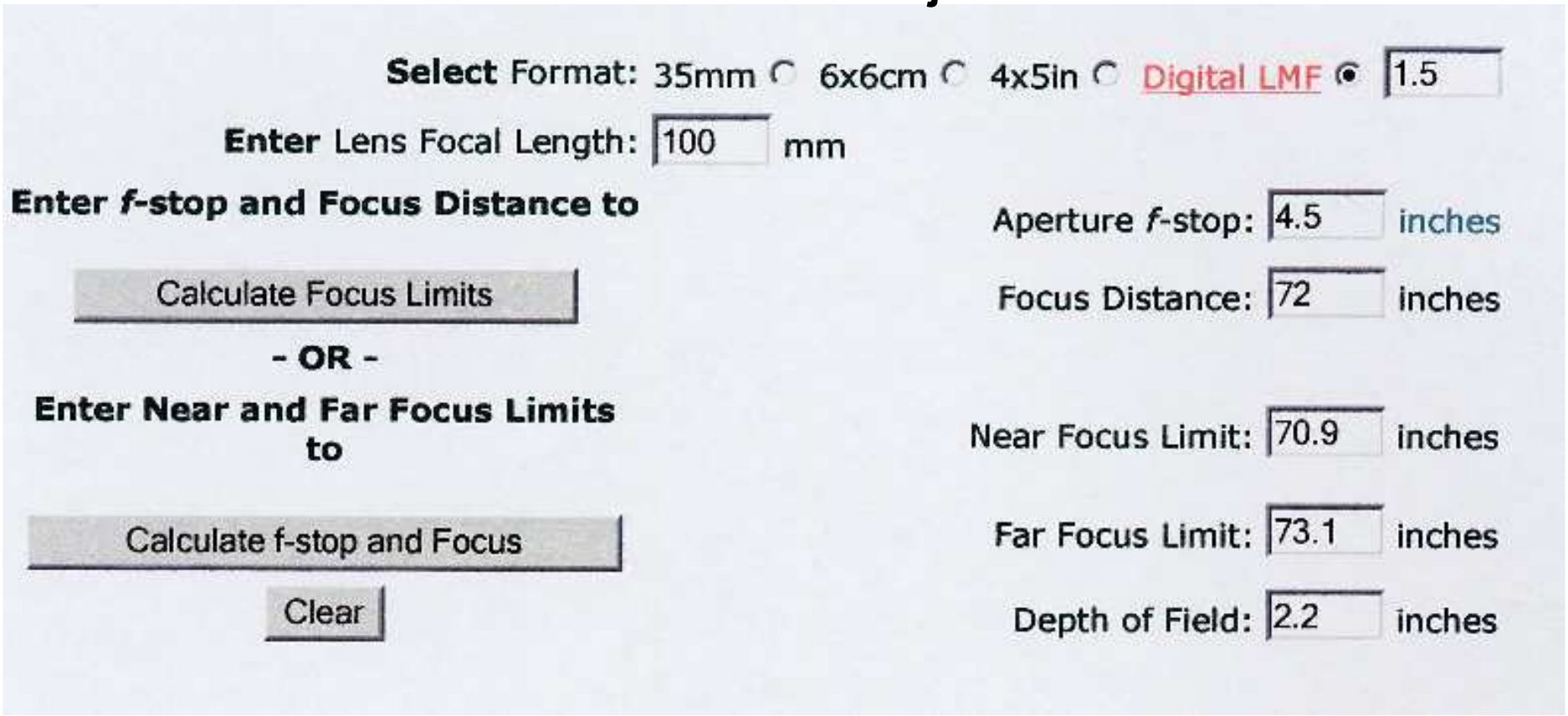
  http://www.dofmaster.com/dofjs.html

- You can get it off your mobile phone!

  http://www.jibble.org/dofcalc/

**Calculating Depth of Field at f4.5 and**

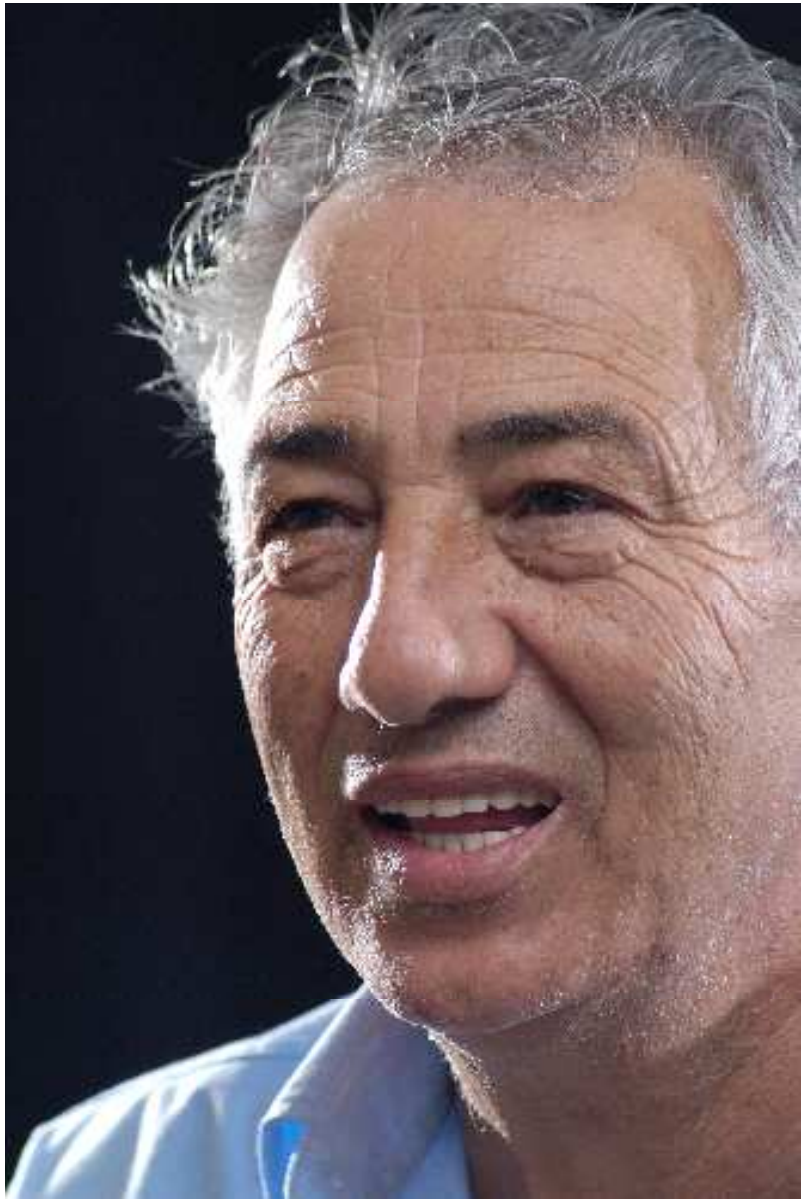
**72 inches to subject**




DOF = 2 inches

How can you take a portrait with a DOF of 2”?

F5.6

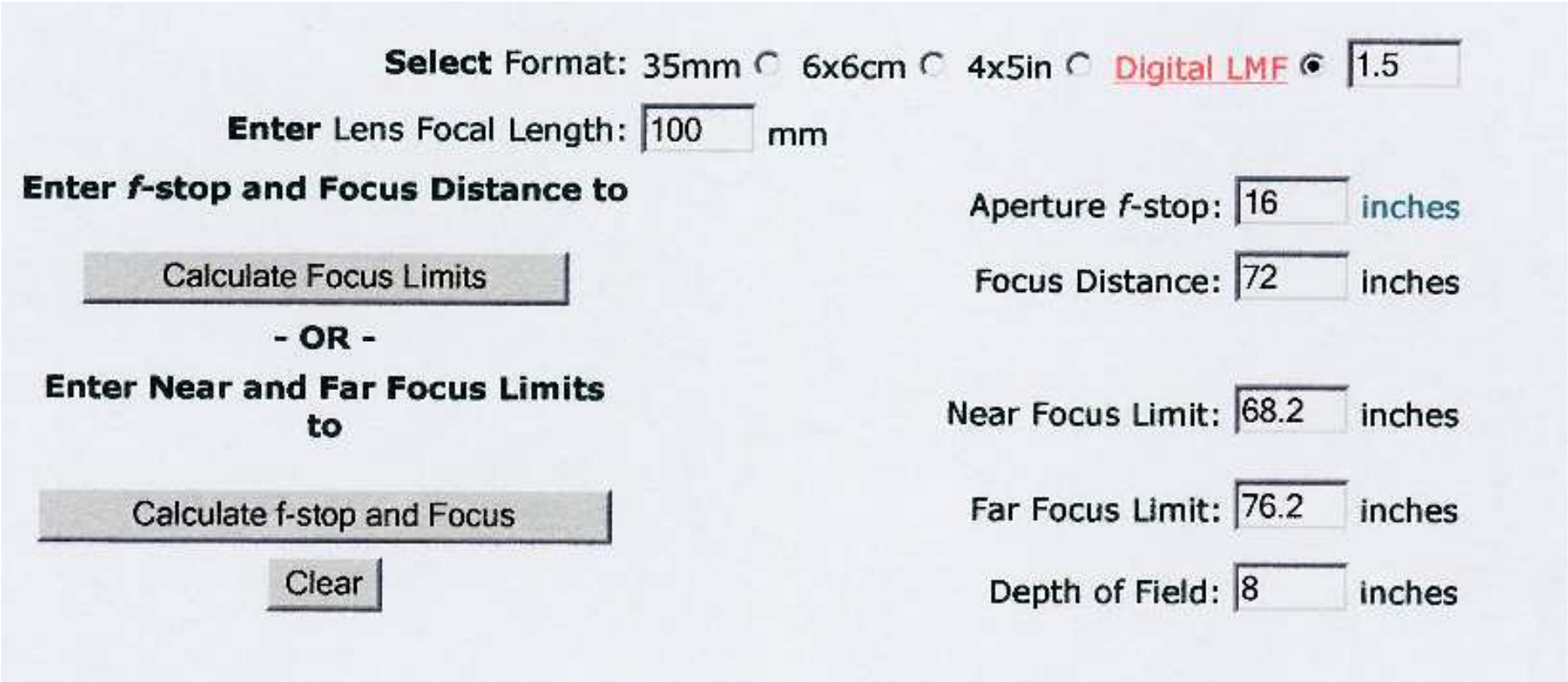


Teeth in focus.

Right eye going soft.

Depth of Field is too shallow

# Calculating Depth of Field at f16




DOF = 8 inches

f16

Much more of the face is sharp.

However, it can be difficult to work at f16 with portraits. You need bright lights or a slow shutter speed

# Depth of Field Chart

- The next slide shows a chart that is independent of the lens being used.
- It depends upon the size of the area you are attempting to capture.
- It is a simple ready-reckoner.

**Depth of field estimates for various magnifications (35mm)**
**(in mm)**

| Width | Mag | f5.6 | f8 | f11 | f16 | f22 | f32 |
|---|---|---|---|---|---|---|---|
| 350mm | 1:10 | 41 | 58 | 80 | 116 | 160 | 232 |
| 310mm | 1:9 | 33 | 48 | 65 | 95 | 131 | 190 |
| 280mm | 1:8 | 27 | 38 | 52 | 76 | 105 | 152 |
| 240mm | 1:7 | 21 | 30 | 41 | 59 | 81 | 118 |
| 210mm | 1:6 | 16 | 22 | 30 | 44 | 61 | 89 |
| 170mm | 1:5 | 12 | 15 | 20 | 29 | 40 | 60 |
| 140mm | 1:4 | 7 | 11 | 15 | 21 | 29 | 42 |
| 100mm | 1:3 | 4 | 6 | 9 | 13 | 17 | 25 |
| 70mm | 1:2 | 2 | 3 | 4 | 6 | 9 | 13 |
| 35mm | 1:1 | 0.7 | 1.1 | 1.5 | 2.1 | 2.9 | 4.2 |
| 17mm | 2:1 | 0.3 | 0.4 | 0.5 | 0.8 | 1.1 | 1.6 |
| 12mm | 3:1 | 0.2 | 0.2 | 0.3 | 0.5 | 0.6 | 0.9 |
| 9mm | 4:1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.6 |

At f11 a life size (1:1) image of a bee has a DOF of 1.5mm.

At f32 a life size (1:1) image has a DOF of 4.2mm.

f32 - Extensive depth of field

f4 - Shallow depth of field

# Is a shallow DOF wrong?

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- YES – if it results in blurring parts of the image which you want to have sharp.

# Is a shallow DOF wrong?

- YES – if it results in blurring parts of the image which you want to have sharp.

- NO – if it focuses the viewer's attention on the part of the image that the photographer intends.

F4 focuses your attention on just this section.

# Hyperfocal Distance

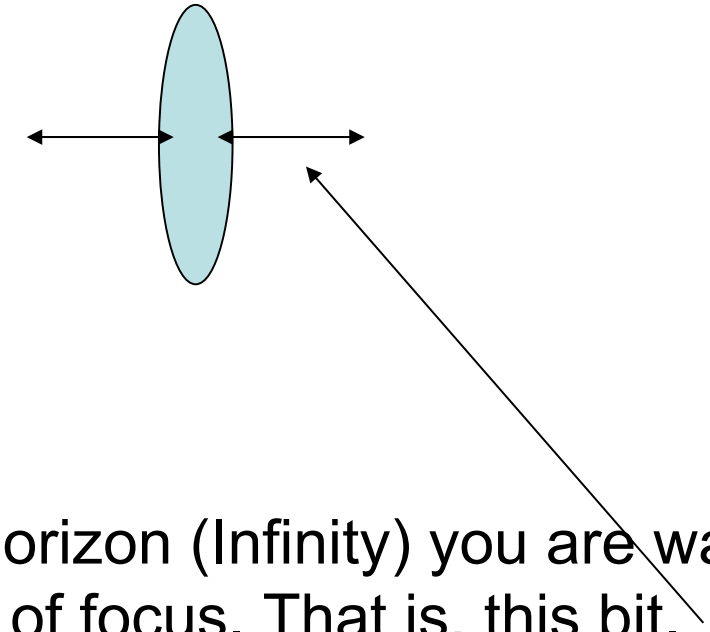
- This is an important concept especially for landscape photographers - what a stupid and unhelpful name!

# Hyperfocal Distance

Think of it as a simple way of increasing the Depth of Field when taking landscapes.

# Hyperfocal Distance

When you focus on an object there is a zone each side which is acceptably sharp.



If you focus on the horizon (Infinity) you are wasting half of the potential area of focus. That is, this bit.

# Focussed on infinity at f16


This side of the focus point has been wasted.

Everything from 5m to infinity in focus

# Focussed on HFD for f16


Set infinity mark to f16

Now DOF is from 2.75m to infinity

Focussed on infinity at f16


5m to infinity

Focussed on HFD


2.75m to infinity

# Why doesn’t my lens have a DOF scale?


Zoom lenses made it too difficult to show the scale because the depth of field changes as you zoom.

# So how do I work out my HFD?

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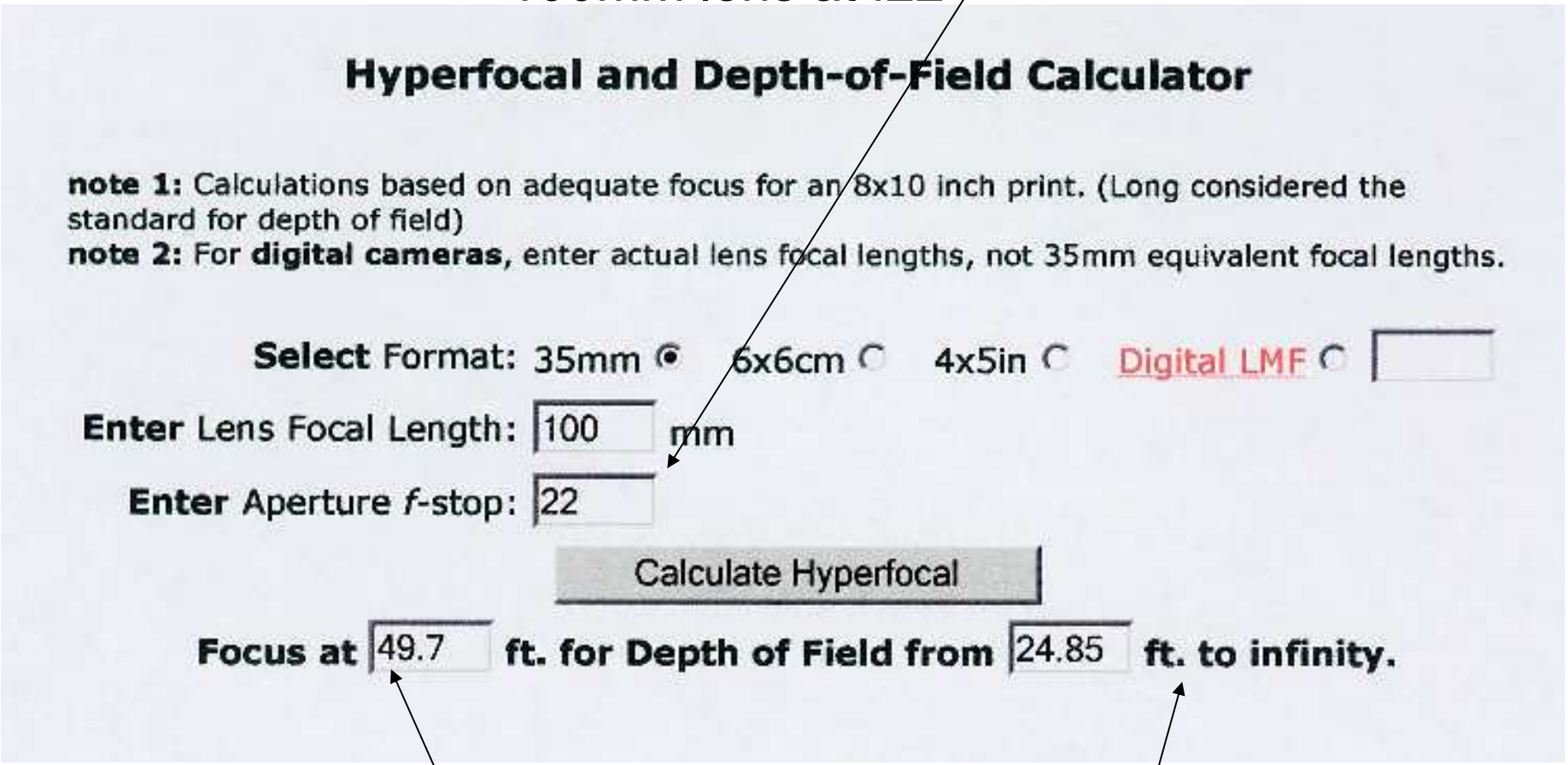
It is easy! Watch!

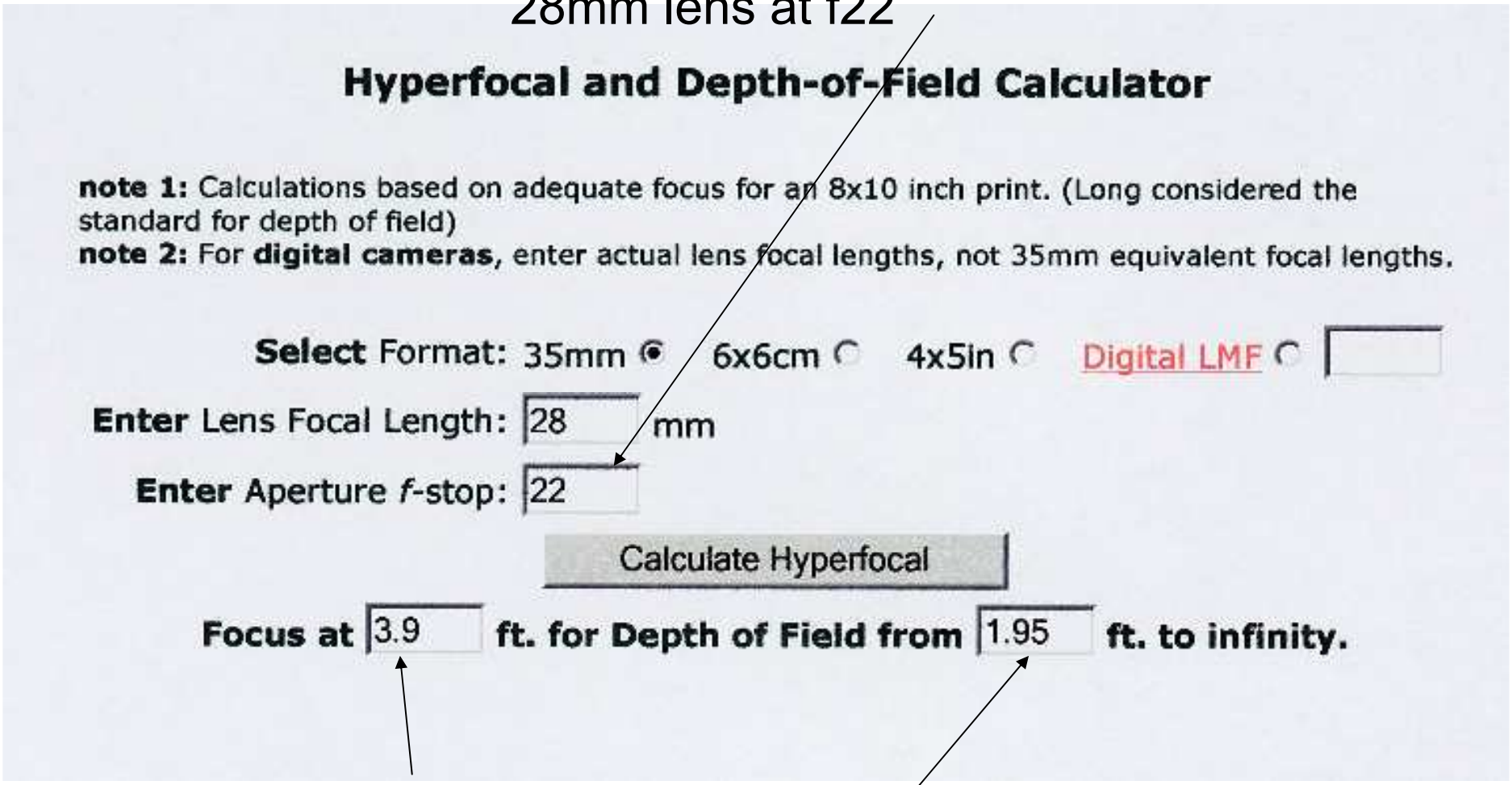
100mm lens at f22




HFD= 50 FT

DOF = 25 ft to infinity

28mm lens at f22




HFD= 4 FT

DOF = 2 ft to infinity

# Planning DOF for your images

# F22 – large DOF but do you want it all sharp?

Why would you want this rock to be attracting attention?

F8 – attention is focussed here. Background blurred.

F4 – Very shallow DOF. Rock is not noticed.

# Now what?

- Find your DOF button

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- Get a DOF calculator URL and work out typical DOF for the types of image you take http://dfleming.ameranet.com/dofjs.html

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- Take some photos **after planning your DOF**

The end